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ABSTRACT

The findings of two studies establish some deleterious effects of unsatisfactory physical environment on school children. However, modern technology enables the exercise of total environmental control in new and existing facilities. Between the realities of today and the exceptations of tomorrow we have a transitional model--the open plan concept. Principals must consider open space in terms of the potential manipulation of many subspaces, a manipulation dictated by innovative learning activities. Educational space should be able to change with the educational program and should involve: (1) differentiation of scale, (2) a sense of place, (3) a focal point, (4) differentiation of mood, (5) directionality, and (6) furnishings and equipment. Space modification effort also involves the control of acoustics and illumination. (Author/MLF)

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HELPING PRINCIPALS MAKE BETTER USE OF EXISTING FACILITIES

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AS THE CHILDREN OF TODAY WILL BE SPENDING HALF OF THEIR LIVES IN THE 21ST CENTURY, THE CHALLENGE OF PREPARING THEM FOR A LIFE WHICH DOES NOT YET EXIST AND WHOSE NATURE CAN ONLY BE IMAGINED IS AN AWESOME TASK FOR US ALL. IT IS IMPERATIVE, THEREFORE, THAT WE IN EDUCATION AS WELL AS ALL CONCERNED LAYPEOPLE RECOGNIZE THIS CHALLENGE AND BEGIN TO TAKE THE NECESSARY STEPS TO MEET IT.

MANY EDUCATORS HAVE ALREADY BEGUN TO DO THIS. THEY ARE BUSY RE-EXAMINING EVERY FACET OF THE TEACHING-LEARNING PROCESS IN AN EFFORT TO OBTAIN GREATER EFFICIENCY AND GREATER PRODUCTIVITY. THE CURRICULUM IS UNDER CONSTANT REVIEW. AND BASIC PHILOSOPHIES INVOLVING SUCH THINGS AS THE LENGTH OF THE SCHOOL DAY AND SCHOOL YEAR, AND TRADITIONAL TEACHING AND GRADING METHODS ARE BEING CAREFULLY RE-EVALUATED.

IN THE PAST THE CONCEPTS OF "TEACHER," "CLASS," "CURRICULUM," AND "SCHOOL" EACH HAD A NEARLY UNIVERSALLY ACCEPTED MEANING. EVERYONE KNEW WHAT A TEACHER DID, WHAT THE "IDEAL" CLASS SIZE WAS, WHAT THE CURRICULUM CONSISTED OF, AND WHAT A SCHOOLHOUSE WAS LIKE. AND THESE CONVENIENT DEFINITIONS SAVED A LOT OF TROUBLESOME THINKING, BECAUSE IN CONCERT THEY SERVED TO ANSWER A LOT OF TROUBLESOME QUESTIONS ABOUT HOW TO "DO" EDUCATION. SCHOOL DISTRICTS SIMPLY CONSTRUCTED A PROGRAM OUT OF THESE BASIC CONCEPTS, BRINGING TEACHERS TOGETHER WITH UNIFORM-SIZED

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GROUPS OF CHILDREN OF SIMILAR AGES, SUPPLYING THEM WITH TEXT AND WORK-BOOKS, DIVIDING THE SCHOOL DAY INTO STANDARD BLOCKS OF TIME, AND DEPLOYING PEOPLE AND RESOURCES THROUGHOUT AN "EGGCRATE" SCHOOL BUILDING.

TODAY, HOWEVER, IN MANY DISTRICTS SCHOOL AUTHORITIES ARE STARTING WITH THE INDIVIDUAL PUPIL AND WITH MANY DIFFERENT PROGRAMS. ON THE PREMISE THAT NO ONE PROGRAM IS NECESSARILY APPROPRIATE FOR EVERYONE, THEY ARE ATTEMPTING TO MEET EACH STUDENT WHERE HE OR SHE IS AND TO ADAPT A COMBINATION OF PROGRAMS TO SPECIAL NEEDS.

AS WE CLOSE OUT THE 20TH CENTURY, WE CAN ALSO EXPECT TO SEE SOME DRAMATIC CHANGES IN SCHOOL FORMS AND MATERIALS, BOTH EXTERNAL AND INTERNAL. NO LONGER WILL SCHOOL PLANNERS AND ARCHITECTS BE LIMITED TO THE TRADITIONAL BUILDING MATERIALS OF BRICK, STONE AND MORTAR. TECHNOLOGY HAS ALREADY PRODUCED EXCITING NEW SUBSTANCES FOR BUILDING CONSTRUCTION SUCH AS PLASTICS AND OTHER SYNTHETICS. THESE BUILDING MATERIALS WILL ENABLE ARCHITECTS TO BREAK AWAY FROM THE CONVENTIONAL GEOMETRIC CONFIGURATIONS OF THE PAST. "ENCAPSULATED SPACE," CONSISTING OF INFLATABLE, LIGHT WEIGHT FABRICS IN "BUBBLE" OR "SAUSAGE" SHAPES, IS JUST ONE REAL POSSIBILITY FOR THE FUTURE. AND INTERIORS WILL INCORPORATE UNIQUE APPROACHES TO CREATING NEW PHYSICAL ENVIRONMENTS. WALLS, AS WE KNOW THEM, WILL DISAPPEAR AND LIGHTING AND ELECTRONICS WILL SERVE TO DELIMIT SPACE.

AT THIS POINT, LET'S TAKE A FEW MOMENTS TO CONSIDER THE MATTER OF PHYSICAL ENVIRONMENT IN THE SCHOOLS OF THE RECENT PAST AND PRESENT.

BY PHYSICAL ENVIRONMENT, I AM REFERRING TO THE ACOUSTICAL, ILLUMINATIONAL, THERMAL, AND VISUAL ELEMENTS; IN OTHER WORDS, THE SOUND, LIGHT, TEMPERATURE, AND COLOR COMPONENTS OF AMERICAN SCHOOLHOUSES.

IN THE FORTIES, DR. HAROLD B. HARMON, AN ENVIRONMENTAL DESIGN SPECIALIST, CONDUCTED EXTENSIVE STUDIES OF THE POSSIBLE EFFECTS OF PHYSICAL ENVIORNMENT ON ELEMENTARY CHILDREN. DR. HARMON, TOGETHER WITH A MAJOR TASK FORCE OF MEDICAL AND EDUCATIONAL PERSONNEL, STUDIED 160,000 TEXAS SCHOOL CHILDREN AND THEIR CLASSROOMS OVER A FIVE YEAR PERIOD IN AN ATTEMPT TO ASCERTAIN THE EFFECTS, IF ANY, OF VARIOUS SCHOOL BUILDING ENVIRONMENTS ON CHILDREN, AND HENCE, ON LEARNING.

DR. HARMON'S TASK FORCE BEGAN BY MAKING A DETAILED INVENTORY OF BOTH THE PHYSICAL AND PSYCHOLOGICAL PROBLEMS AFFLICTING EACH OF THE 160,000 YOUNGSTERS. THEY ALSO MADE A THOROUGH INVESTIGATION OF THE CLASSROOM FACTORS WHICH MIGHT BE RELATED TO THOSE PHYSICAL AND PSYCHOLOGICAL DIFFICULTIES. WITHOUT LABORING THE STUDY, DR. HARMON FOUND THAT 52 PER CENT OF THE CHILDREN WERE LEAVING ELEMENTARY SCHOOL WITH AN AVERAGE OF TWO OBSERVABLE BUT PREVENTABLE DEFECTS PER CHILD. THESE DEFECTS WERE EITHER IN ADDITION TO THOSE RECORDED EARLIER DURING THE INVENTORY STAGE OR AGGRAVATIONS OF THE ORIGINAL PHYSICAL AND/OR PSYCHOLOGICAL DISORDERS.

THESE DISORDERS WERE CHARACTERIZED AS CHRONIC INFECTIONS, POSTURAL AND VISUAL PROBLEMS AND THE RESULTANT BEHAVIORAL PROBLEMS, AND WERE DIRECTLY RELATED TO SUCH THINGS AS <u>IMPROPER LIGHTING</u> (SKY

GLARE -- DIRECT SUN OR SUN REFLECTION, AND POOR ILLUMINATION -- TOO MUCH OR TOO LITTLE LIGHTING), IMPROPER SEATING (BADLY DESIGNED DESKS AND/OR CHAIRS -- MINIATURIZATION OF ADULT FURNITURE), IMPROPER CLASS-ROOM ARRANGEMENT (IN RELATIONSHIP TO LIGHT, HEAT, AND VENTILATION SOURCES), AND IMPROPER DECORATION (ABNORMALLY HIGH COLOR CONTRASTS AND SHINY SURFACES). THE SCIENTIFIC OBSERVATIONS MADE OF THE RELATIONSHIP BETWEEN THE PHYSICAL ENVIRONMENT FACTORS AND THE PROBLEMS OF THE CHIL-DREN INDICATED THAT THESE UNFORTUNATE DEVIATIONS WERE DEFINITELY CAUSED BY THE VARIOUS PHYSICAL FORCES ATTACKING EACH CHILD ON A DAILY BASIS. THIS STUDY DEMONSTRATED DRAMATICALLY THE STARTLING EFFECTS THAT SCHOOL ENVIRONMENTS CAN AND DO HAVE ON THE HEALTH, DEVELOPMENT AND LEARNING OF CHILDREN.

ANOTHER STUDY CONDUCTED AT THE UNIVERSITY OF IOWA IN THE MORE RECENT PAST DEALT SPECIFICALLY WITH THE RELATIONSHIP BETWEEN THE THERMAL ENVIRONMENT AND LEARNING. TWO CLASSROOMS, WHICH WERE IDENTIAL IN EVERY RESPECT EXCEPT FOR THE THERMAL CHARACTERISTICS, WERE CONSTRUCTED ON THE IOWA CAMPUS. THE STUDENT POPULATIONS WERE CAREFULLY SELECTED FOR EXACT MATCHING AND THE ACTUAL EDUCATIONAL ASPECTS OF THE STUDY WERE UNDER THE DIRECT SUPERVISION OF UNIVERSITY PERSONNEL. THE SO-CALLED "IDEAL" CLASSROOM'S THERMAL ENVIRONMENT WAS MAINTAINED AT TEMPERATURES BETWEEN 69 AND 74 DEGREES, A RELATIVE HUMIDITY OF 40 TO 60 PER CENT, AND AN AIR MOVEMENT OF 20 TO 40 FEET PER MINUTE. THE "TYPICAL" CLASSROOM'S THERMAL ENVIRONMENT CONSISTED OF TEMPERATURES RANGING FROM 71 TO 81 DEGREES,

A RELATIVE HUMIDITY OF BETWEEN 20 AND 48 PER CENT, AND AN AIR MOVEMENT OF 15 TO 25 FEET PER MINUTE.

THROUGH A SERIES OF PRE-TESTS, SIX WEEK TEACHING UNITS, AND POST-TESTS, PLUS THE ACTUAL SWITCHING OF CLASSROOMS BY BOTH GROUPS OF STUDENTS FOR RELIABILITY PURPOSES, AN ACCURATE MEASUREMENT OF PUPIL ACHIEVEMENT IN RELATIONSHIP TO THE THERMAL ENVIRONMENT WAS OBTAINED. THE FINDINGS SHOWED THAT CHILDREN, OF BOTH HIGH AND LOW ABILITIES, DO SIGNIFICANTLY BETTER IN AN IDEAL THERMAL ENVIRONMENT THAN THOSE WHO MUST PERFORM IN A CLASSROOM ENVIRONMENT CHARACTERIZED BY OVERHEATING, LOW HUMIDITY, AND POOR VENTILATION.

AT THIS JUNCTURE, YOU ARE PROBABLY WONDERING WHAT THESE TWO STUDIES HAVE TO DO WITH YOU, YOUR TEACHERS, AND WITH YOUR STUDENTS. FIRST, MANY OF THE SCHOOLS IN THE TEXAS STUDY WERE PLANNED WITH LITTLE OR NO EDUCATOR INPUT. SECOND, SINCE BOTH INVESTIGATIONS WERE COMPLETED SOME TIME AGO, SOME OF YOU HAVE PROBABLY BENEFITTED FROM THESE RESEARCH EFFORTS. THIRD, RECENT ARTICLES IN PROFESSIONAL JOURNALS INDICATE THAT MORE SUCH RESEARCH IS BADLY NEEDED, BECAUSE SCHOOLS NOT UNLIKE THOSE IN THE FORMER STUDY ARE STILL BEING DESIGNED AND BUILT. AND FOURTH, MANY OF YOU ARE OPERATING IN SCHOOL FACILITIES NOW WHICH ARE PROBABLY NO BETTER THAN THE ABOVE.

BUT GIVEN THE FACT THAT THERE ARE SCHOOLS WHICH HURT CHILDREN AND HINDER TEACHERS, WHAT WOULD I HAVE YOU KNOW AND DO? WELL, FOR ONE THING, NEITHER STUDENTS NOR TEACHERS SHOULD HAVE TO DEFEND THEMSELVES

AGAINST HEAT, COLD, DRAFTS, DUST, NOISE, ODOR, OR HUMIDITY IN AMERICAN SCHOOLS. WITH RESPECT TO THE PHYSICAL ENVIRONMENT OF SCHOOLS, MODERN TECHNOLOGY HAS ENABLED US TO EXERCISE TOTAL ENVIORNMENTAL CONTROL IN OUR EDUCATIONAL PLANTS, BE THEY NEW OR EXISTING FACILITIES. SUCCINCTLY STATED, THIS INVOLVES THE TOTALITY OF THE SOUND, LIGHT, TEMPERATURE AND COLOR COMPONENTS.

ACOUSTICALLY, WE NOW HAVE SOUND-RATED CEILING AND WALL PANEL MATERIALS, CARPETING, AND NEARLY NOISE-FREE HEATING, COOLING AND VENTILATING SYSTEMS. ILLUMINATION ENGINEERS HAVE DEVELOPED BOTH THE LUMINOUS CEILING COMPONENT, WITH LONG-LASTING, NATURAL-LIGHT, FLUORESCENT TUBING, AND THE NEW ACCENT LIGHTING TECHNOLOGY. THE THERMAL ENVIRONMENT CAN BE PERFECTLY REGULATED YEAR-ROUND, INCLUDING PROPER HUMIDITY CONTROL, USING ANY NUMBER OF CENTRAL HEATING AND COOLING PLANTS OR ROOFTOP MULTIPLE UNITS NOW AVAILABLE. AND COLOR CONSULTANTS HAVE GIVEN US AMPLE DATA TO ASSIST IN THE SELECTION OF PROPER VISUAL COLOR SCHEMES, WHICH ARE BOTH PLEASING AND BENEFICIAL TO THE SIGHT.

NOW LET'S BRIEFLY CONTRAST THE EXPECTATIONS OF THE FUTURE WITH THE REALITIES OF TODAY. ALTHOUGH THERE ARE MANY FINE SCHOOLS IN AMERICA, THE MAJORITY OF OUR BUILDINGS IS OUTDATED, INCLUDING SOME WHOSE DOORS OPENED YESTERDAY. DESPITE THE EFFORTS OF SUCH ORGANIZATIONS AS <u>EDUCATIONAL FACILITIES LABORATORIES</u> AND THE <u>COUNCIL OF EDUCATIONAL FACILITY PLANNERS</u> TO INFUSE NEW LIFE INTO SCHOOL DESIGN AND RENOVATION, TOO MANY SCHOOLS HAVE BEEN PATTERNED ON THE PAST. AND WHY HAS REAL

CHANGE BEEN SO HARD TO COME BY? BECAUSE, AS ANY GOOD ARCHITECT KNOWS, "FORM FOLLOWS FUNCTION." THAT IS TO SAY, A SCHOOL BUILDING IS IN ESSENCE AN INTERPRETATION OF WHAT IS PLANNED TO TAKE PLACE INSIDE OF IT.

IN ADDITION TO THE FAILURE OF MANY EDUCATORS TO SIGNIFICANTLY ALTER THE EDUCATIONAL "FUNCTION" WHICH THE ARCHITECT'S "FORM" IS TO FOLLOW, THERE ARE ALSO OTHER IMPEDIMENTS TO IMAGINATIVE INNOVATION IN SCHOOL DESIGN. THESE INCLUDE ARCHAIC BUILDING CODES, PROSCRIPTIVE LEGISLATION, AND STATE REGULATIONS AND STANDARDS.

EVEN THOUGH THE GAP BETWEEN THE REALITIES OF TODAY AND THE EXPECTATIONS OF TOMORROW IS SIGNIFICANT, WE DO HAVE A TRANSITIONAL MODEL AT OUR DISPOSAL -- THE OPEN PLAN CONCEPT. THE "OPEN PLAN" OFFERS THE KIND OF FLEXIBILITY NECESSARY TO SUSTAIN THE RE-STRUCTURING OF EDUCATION WHICH IS FAST-APPROACHING. THE MAIN ARCHITECTURAL FEATURE OF AN OPEN PLAN STRUCTURE IS THE ABSENCE OF LOAD-BEARING INTERIOR WALLS. THIS LEAVES VIRTUALLY THE ENTIRE INNER SPACE OPEN AND USABLE.

ADMITTEDLY NOT EVERYONE CONNECTED WITH OPEN PLAN SCHOOLS NOW IN OPERATION WOULD AGREE WITH MY ASSESSMENT OF THEIR DESIRABILITY. MANY TEACHERS AND PRINCIPALS HAVE HAD SHATTERING EXPERIENCES WHEN ATTEMPTING TO FUNCTION IN THIS NEW ENVIORNMENT. THE MAJOR CRITICISMS OF OPEN PLAN SCHOOLS, RUNNING THE GAMUT FROM TOO MUCH NOISE AND VISUAL DISTRACTION TO TOO MUCH STATIC ELECTRICITY, THOUGH PROBABLY VALID IN CERTAIN INSTANCES, ARE NOT ONLY EASILY REMEDIED BUT ALSO GENERALLY INDICATIVE OF MORE SERIOUS PROBLEMS. THE REAL CRUX OF THESE PROBLEMS

IS THE LACK OF PROPER PLANNING AND TRAINING.

SO NOT ALL OPEN PLAN SCHOOLS HAVE BEEN SUCCESSES; SOME, IN FACT, HAVE BEEN DISASTERS. THESE MIXED EXPERIENCES ARE CLEAR EVIDENCE OF THE NEED FOR A BETTER UNDERSTANDING OF THE OPEN CONCEPT AND THE ELEMENTS NECESSARY FOR EFFECTIVE APPLICATION. TEACHERS AND PRINCIPALS MUST BEGIN TO CONSIDER OPEN SPACE IN TERMS OF THE POTENTIAL MANIPULATION OF MANY SUBSPACES, A MANIPULATION DICTATED BY INNOVATIVE LEARNING ACTIVITIES. FLEXIBLE DESIGN DOES NOT GUARANTEE FLEXIBLE UTILIZATION.

WHEN OPEN PLAN SPACE LACKS PRECISE DEFINITION, IT IS NATURAL FOR TEACHERS AND PUPILS TO SEEK THE PERIMETER WALLS AND CORNERS. EVERYONE WANTS SOME PERSONAL TERRITORY AND TEACHERS SEEM TO WANT THE KIND OF SECURITY SUPPLIED BY THE TRADITIONAL CLASSROOM WITH FOUR WALLS. THIS "PSYCHO-SPATIAL" REACTION, HOWEVER, SUBVERTS THE UNDERLYING PURPOSE OF THE OPEN PLAN CONCEPT. THE KEY AIM OF OPEN SPACE SCHOOLS IS TO PROVIDE AN ATMOSPHERE WHICH BOTH PERMITS AND PROMOTES GREATER INTERACTION BETWEEN AND AMONG TEACHERS AND PUPILS. THIS KIND OF INTERACTION CANNOT TAKE PLACE IF TEACHERS ARE GOING TO ATTEMPT TO APPROXIMATE TRADITIONAL CLASSROOMS BY STAKING OUT A CLAIM ON AN EXTERIOR WALL, LINING UP CHAIRS AND DESKS IN NEAT ROWS, AND ENCLOSING THE AREA WITH TACK AND CHALKBOARD.

BUT HOW CAN THE HUMAN DESIRE FOR A COMFORTABLE SENSE OF ENCLOSURE BE RECONCILED WITH THE UNDENIABLE POTENTIAL OF THE OPEN CONCEPT? FIRST, WE MUST RECOGNIZE THAT THIS DESIRE IS REAL AND NEARLY UNIVERSAL. THE SO-CALLED "TERRITORIAL IMPERATIVE" IS A MUCH-EXPLORED PSYCHOLOGICAL

PHENOMENON. SECOND, WE MUST DEVISE STRATEGIES FOR TAKING ACCOUNT OF THIS CONDITION WITHOUT CANCELLING THE POSITIVE PROPERTIES OF THE OPEN SPACE CONCEPT.

BUT EXACTLY HOW CAN PRINCIPALS LEARN TO MAKE BETTER USE OF THEIR EXISTING FACILITIES, WHETHER OPEN PLAN OR TRADITIONAL EGGCRATE? TO START, THEY MUST BE WILLING TO TAKE A LONG LOOK AT THEIR RESPECTIVE SCHOOLS AND PROGRAMS. THEY SHOULD BECOME TRULY CONVERSANT WITH THE SOUND, LIGHT, TEMPERATURE, AND COLOR COMPONENTS WHICH CONSTITUTE SUCH A MAJOR PORTION OF ANY SCHOOL'S "INTERNAL ATMOSPHERE." THEY SHOULD EXAMINE CLASSROOM ARRANGEMENT AND SCHOOL FURNITURE CRITICALLY. AND THEY MUST KNOW THEIR EDUCATIONAL PROGRAM INTIMATELY. CHANCES ARE THEY WILL BE AMAZED AT WHAT THEY HAVE BEEN REGULARLY OVERLOOKING IN MANY OF THESE AREAS OVER THE YEARS.

IF AN EDUCATIONAL SPACE IS TO FULFILL THE NEEDS OF THE USER, ITS PURPOSES SHOULD BE WELL-DEFINED. WHAT ARE THE PROGRAM NEEDS? WHAT KINDS OF SPACES WILL SERVE THOSE PROGRAM NEEDS? HOW CAN TEACHERS AND STUDENTS MANIPULATE SPACE? THESE ARE IMPORTANT QUESTIONS TO BE CONSIDERED BY PRINCIPALS AS THEY ANALYZE THEIR EXISTING FACILITIES.

EDUCATIONAL SPACE SHOULD BE ABLE TO CHANGE WITH THE EDUCATIONAL PROGRAM AND SHOULD INVOLVE THE FOLLOWING ELEMENTS:

1. DIFFERENTIATION OF SCALE:

AN APPROACH TO CLEARING UP VISUAL CONFUSION OF LARGE OPEN AREAS IS TO BREAK THEM UP WITH SEMIPERMANENT WALLS. SMALLER AREAS ARE OFTEN

EASIER TO COPE WITH. SOME IMPORTANT PROPERTIES OF A SINGLE WALL ARE THAT IT CAN PROVIDE A WATER SOURCE (WORK SINKS AND DRINKING FOUNTAINS) AND STORAGE SPACE, AND CAN EVEN PERMIT SUCH LUXURIES AS A REAR-SCREEN PROJECTION UNIT. REAL OR ARTIFICIAL LEVEL CHANGES OF BOTH THE CEILING AND FLOOR CAN ALSO HELP TO MODIFY SCALE WHEN EMPLOYED WITH SOME OF THE OTHER SPATIAL ELEMENTS TO FOLLOW.

2. A SENSE OF PLACE:

STUDENTS, JUST AS TEACHERS, ARE SUBJECT TO TERRITORIAL FEELINGS. THEY ALL WANT TO KNOW WHAT AREAS THEY ARE FREE TO USE AND WHICH ARE RESTRICTED. LEAVING A SAFETY AISLE WHEN ARRANGING FURNISHINGS CAN BE A SIGNIFICANT PART OF THE SPATIAL LAYOUT AND VERY USEFUL IN DEFINING TERRITORIES AS WELL. STUDENTS NEED AND WANT SPATIAL BOUNDARIES. PART OF BEING IN A GROUP IS KNOWING WHAT SPACE IS OCCUPIED BY THE GROUP. VISION SCREENS, FURNITURE, CHANGES IN CARPET COLORING, AND BANNERS CAN BE ADDED TO EXISTING ELEMENTS TO FURTHER DEFINE BOUNDARIES BETWEEN SPACES.

3. A FOCAL POINT:

A FOCAL POINT IS A CRITICAL FACTOR IN GIVING AN EDUCATIONAL SPACE CHARACTER. PLATFORMS, LOFTS, CONVERSATION PITS, AND ACCENT LIGHTING ARE THE "STAGE PROPS" SUGGESTING THE THRUST OF THE EDUCATIONAL PROGRAM IN THAT SPACE.

4. DIFFERENTIATION OF MOOD:

THE MOOD OF A SPACE IS THE TONE SET NOT ONLY BY THE VARIOUS

ELEMENTS JUST MENTIONED, BUT ALSO BY SUCH THINGS AS COLORS, TEXTURES, GRAPHICS, AND DEGREES OF ENCLOSURE OF THE SPACE. THE "HARDNESS" OR "SOFTNESS" OF SURFACES CAN REINFORCE THE DESIRED ATMOSPHERE. FOR EXAMPLE, AN AREA PARTIALLY ENCLOSED, CARPETED AND CUSHIONED, WITH ACCENT LIGHTING, SUGGESTS A QUIET, RELAXED ACTIVITY; WHILE A TILED, BRIGHTLY-LIGHTED CORRIDOR DISCOURAGES ANY SLOWING DOWN.

5. DIRECTIONALITY:

DIRECTIONAL SPACES, MOVEMENT AREAS WITHIN TEACHING SPACES AND SCHOOL TRAFFIC PATTERNS, ARE ALSO SUBJECT TO TONE SETTING. THE CLASSROOM OR TEACHING STATION SPACE CAN HAVE A CARPET RUNNER ALONG WHICH LEARNING CENTERS ARE LOCATED. THE NECESSARY ENTRANCE-EXIT TRAFFIC ZONES CAN BE TILED TO MINIMIZE COMFORT AND, AS A RESULT, KEEP PEOPLE MOVING. WALLS AND PARTITIONS CAN HAVE BRIGHT, LINEAR, FAST-MOVING GRAPHICS THAT SAY JUST THAT: "KEEP MOVING." ON THE OTHER HAND, TRAFFIC AREAS CARPETED AND BOUNDED BY DISPLAY AND PROJECT CASES FILLED WITH STUDENT ARTIFACTS INVITE BOTH PUPILS AND TEACHERS TO STOP AND TO LOOK.

6. FURNISHINGS AND EQUIPMENT:

SIMPLICITY OF FORM, INTEGRITY OF MATERIALS, AND CLARITY OF FUNCTION ARE THE KEYS TO THE MOST FLEXIBLE FURNISHINGS AND SPACES. FLEXIBLE EQUIPMENT AND FURNITURE CAN INSPIRE BOTH STUDENTS AND TEACHERS TO DISCOVER NEWS WAYS TO USE THEM. TRADITIONAL WORK SURFACES -- DESKS, TABLES, CHAIRS AND CARRELS -- WILL STILL BE NEEDED, BUT HOPEFULLY THEIR SETTING AND ARRANGEMENT WILL REFLECT NEW APPROACHES TO THE EDUCA-

TIONAL PROGRAM.

TWO PERSISTENT PROBLEMS IN ANY SPACE MODIFICATION EFFORT ARE THE CONTROL OF ACOUSTICS AND ILLUMINATION; SOUND AND LIGHT MANIPULATION. A COMFORTABLE SOUND CONDITION HAS APPROPRIATE CONTENT AND LEVEL. THE LEVEL MAY BE SURPRISINGLY HIGH AND STILL BE UNNOTICED IF THE CONTENT IS IN CONTEXT. FOR EXAMPLE, A TRAY OF DISHES CLATTERING TO THE CAFETERIA FLOOR MAY HAVE THE IDENTICAL DECIBEL LEVEL AS THE SOUND OF GENERAL MOVEMENT AND CONVERSATION, BUT IT WILL IMMEDIATELY CAPTURE TOTAL ATTENTION MOMENTARILY BECAUSE IT IS INCONSISTENT WITH THE NORMAL SOUND CONTENT.

SOUND CONDITIONING IS NOW A VIABLE TECHNOLOGY AND THE SCHOOL USER CAN BENEFIT FROM ITS SERVICES. THE PRINCIPAL MEASURE OF SOUND ABSORPTION IS ACCOMPLISHED IN THE FLOOR AND CEILING OF THE STRUCTURE. GENEROUS EMPLOYMENT OF CARPETING AND ABSORPTIVE CEILING MATERIALS ARE STILL THE BEST METHODS OF CONTROL. ADDITIONAL CONTROL IS POSSIBLE THROUGH THE USE OF ABSORPTIVE FURNISHINGS. BUT EVEN THEN, THE USERS THEMSELVES MUST BE AWARE OF THEIR OWN ROLE IN CREATING A SUCCESSFUL ACOUSTICAL AFFECT. THEY MUST PROVIDE ZONAL MANAGEMENT BY PLACING NEAR ONE ANOTHER ONLY THOSE ACTIVITIES WHOSE SOUND CONTENT AND SOUND LEVELS ARE NATURALLY COMPATIBLE. THEREFORE, PLANNING AND SCHEDULING OF APPROPRIATE ADJACENCIES ARE ESSENTIAL.

FINALLY, THERE IS THE MATTER OF TASTE. THE LIBRARIAN AND THE PHYSICAL EDUCATION TEACHER ARE NOT LIKELY TO AGREE ON THE QUALITIES OF

GOOD SOUND. FURTHERMORE, THERE IS INCREASING EVIDENCE THAT MANY PEOPLE ARE SEEKING SIGNIFICANTLY MORE KINETIC, ENERGETIC SURROUNDINGS. WE CAN EXPECT THAT THIS NEW "ACOUSTICAL APPETITE" WILL WANT TO BE EXPRESSED IN THE LIFE-STYLES OF OUR SCHOOLS. OUR ORIENTATION IN THE PAST HAS BEEN SO DIRECTED TOWARD REMOVING SOUND AND HUSHING THINGS UP, WE HAVE FAILED TO RECOGNIZE THAT IN SO DOING WE OFTEN REMOVED THE DESIRABLE, CONTENT-LADENED SOUNDS WHICH EXPRESS THE UNIQUENESS OF OUR SCHOOLS. WE MUST COME TO REALIZE THAT SOUND EXPRESSION MERITS THE SAME CONCERN WE GIVE TO SOUND SUPPRESSION. IN THE SAME MANNER THAT WE SPECIFY OTHER FACILITY REQUIREMENTS, WE SHOULD BE EAGER TO SPECIFY THE CHARACTER OF SOUND WE WANT. IT MAY BE WE WILL FIND THAT THE ACOUSTIC FLAVOR WE WANT IN OUR SCHOOLS IS FAR MORE ANIMATED AND VIGOROUS THAN THE SO-CALLED "QUIET" OF THE PAST.

A GOOD VISUAL ENVIRONMENT IS A COLLABORATION BETWEEN THE PROPERTIES OF THE OBJECTS WE LOOK AT AND THE WAY IN WHICH THEY ARE LIGHTED. UNLESS THE TWO ARE EQUALLY CONSIDERED IN PLANNING, UNPLEASANT OR UNSUCCESSFUL VISUAL RESULTS ARE UNAVOIDABLE.

THERE HAS BEEN A TENDENCY TO BLAST SCHOOL INTERIORS WITH LIGHT FAR BEYOND THE NECESSARY LEVELS FOR READING AND WRITING ACTIVITIES. THE EFFECT OF SUCH SATURATION LIGHTING IS TO ROB THE ENVIRONMENT OF COMMUNICATION DETAIL. FORMS BECOME FLAT, HARSH, AND STERILE. THIS IS PARTICULARLY IMPORTANT IN ITS EFFECT ON HOW PEOPLE LOOK TO EACH OTHER. IT ALSO ROBS SPACE OF TONAL INTEREST AND VARIATION.

TONALITY:

IN MOST SCHOOLS THE ARTIFICIAL LIGHTING IS SUPPLIED ALMOST EXCLUSIVELY BY FLUORESCENT FIXTURES AND THE BUILDINGS HAVE TENDED TO BE SUFFUSED WITH AN EERIE QUALITY. THIS IS DUE TO THE NATURE OF THE TUBES THAT WERE, UNTIL RECENTLY, THE ONLY KIND AVAILABLE. THOUGH INCANDESCENT BULBS CAST A MORE FRIENDLY LIGHT, MOST ARCHITECTS HAVE OPTED FOR FLUORESCENT TUBES BECAUSE THEY ARE MORE EFFICIENT AND CONTRIBUTE LESS UNWANTED HEAT GAIN. TODAY, HOWEVER, THE NEWER FLUORESCENT TUBES HAVE A MORE DESIRABLE WARM SPECTRUM RANGE. THUS SCHOOLS CAN NOW HAVE LIGHT SOURCES THAT COMBINE THAT "WARM" EFFECT AND STILL HAVE EFFICIENCY.

ZONALITY:

LIGHTING SHOULD BE EMPLOYED TO DEFINE ZONES OF SPACE. BRIGHTLY LIT ZONES HAVE A MAGNETIC EFFECT THAT DRAWS PEOPLE TOWARDS THEM AND SUGGESTS ACTIVITY. DIMMER AREAS CREATE THE BOUNDARIES AROUND THESE ACTIVITY ZONES. LIGHT MODULATED ACCORDING TO ZONES PROVIDES CUES AS TO PLACE, THUS PROVIDING PSYCHOLOGICAL COMFORT. TO DELIVER THIS KIND OF ZONALITY, HOWEVER, REQUIRES MORE SWITCHES, CONTROLS, AND THE RELOCATABILITY OF LIGHT SOURCES THAN IS GENERALLY AVAILABLE.

FINALLY, A SUCCESSFUL OVERALL EFFECT REQUIRES THE INTRODUCTION OF LIGHTING AT VARIOUS HEIGHTS. DROP LIGHTS, DESK LIGHTS AND UNDERSHELF LIGHTS ARE ALL PART OF THE PROCESS THAT CAN GIVE SPACE THAT IMPORTANT VARIATION IN TONE AND ZONE. MOREOVER, THEY GIVE THE INDIVIDUAL TEACHER SOME CONTROL OVER HIS OR HER OWN MICRO-SURROUNDINGS.

AN IMPORTANT RECENT TREND IN PUBLIC ELEMENTARY EDUCATION HAS BEEN THE REDUCTION OF ALL KINDS OF TERRITORIAL IMPERATIVES -- GRADE, SUBJECT, AND FUNCTION. SUCH TERRITORIES BELONG TO THE PAST, AND THE MORE PROGRESSIVE INTERDISCIPLINARY APPROACHES AS WELL AS NON-GRADING, CORE CURRICULUM, AND TEAM TEACHING ARE GAINING INCREASING ACCEPTANCE. ANY REVERSAL OF THIS TREND WOULD BE COUNTERPRODUCTIVE EDUCATIONALLY AND TEND TO NEGATE OR AT THE VERY LEAST COMPROMISE THE OPEN PLAN CONCEPT.

THEREFORE, OPEN SPACE MUST BE CONSIDERED NEGOTIABLE. ITS ELASTIC QUALITIES INVITE CHOICE AND VARIETY, INCLUDING DEGREES OF ENCLOSURE. AND NEGOTIABLE SPATIAL VARIATIONS ARE THE VERY HALLMARK OF THE OPEN PLAN CONCEPT. SPECIFICALLY, A TEACHER'S NATURAL DESIRE FOR TEACHING PRIVACY -- VISUAL AND AUDITORY -- NEED NOT BE SACRIFICED IN THE OPEN PLAN DESIGN. BY EMPLOYING THE LESSONS OF DIFFERENTIATION OF SCALE AND MOOD, AND OF FOCAL POINT AND FURNISHINGS, PRINCIPALS CAN GUARANTEE SUCH TEACHING INTIMACY WITHOUT THWARTING ANY OF THE OPEN PLAN POTENTIALITY.